



- 1- a) Discuss factors of selection of the design period for a water supply system.
- b) **Design and draw** the collection water supply works for a city of population 150,000 capita, and average water consumption 180 LCD. The source of water is a navigable Canal of H.W.L = (10.00 m), L.W.L = (8.50 m), Bed level = (6.00 m), Ground level = (12.00 m), Road level = (14.00 m), Road width 40.00 m, W Treat level = (35.00 m) and Side slopes 1:1 & 3:2

13 Marks

- 2- a) Compare between rectangular and circular sedimentation tanks.
- b) **Design and draw** the required circular clarifiers for a water treatment plant of production 800 liter/sec.

12 Marks

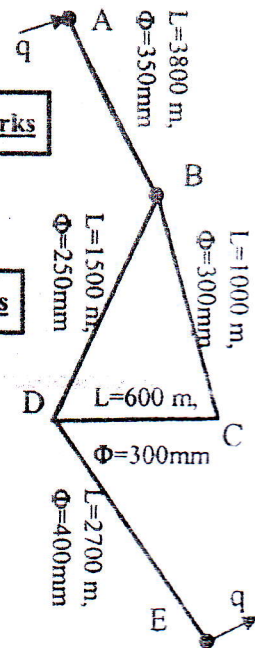
- 3- a) State using sketches the cleaning steps of Slow sand and Rapid sand filters.
- b) Discuss methods of disinfection and factors affecting it in water supply.
- c) **Design and draw** the ground reservoirs for a city of population 150,000 capita and an average daily water consumption of 250 liter per capita.

20 Marks

- 4- a) State using sketches the different types of distribution system. Discuss the advantages and disadvantages of each type.

- b) Determine the head of booster pump at (B) in the shown system to increase the flow (q) from 100 l/s to 180 l/s with maintaining the same head at point (A) and point (E).

15 Marks



- 5- a) Explain sources of sewage and the factors affecting the quality from each source.
- b) Design the sewer to carry peak flow 420 lit/sec when running 2/3 full. Determine the velocity, and the depth of the flow at the minimum flow of 80 lit/sec.

15 Marks

- 6- a) Draw the flow line in Activated Sewage Treatment Plant with mention the function of each unit.
- b) **Design and draw** the aeration tanks required for an activated sludge sewage treatment plant of capacity 90 000 m<sup>3</sup>/day, raw sewage BOD = 500 mg/l, removed BOD in primary tank 35 %, Hydraulic retention time in tank = 10 hrs, and Organic load on tank 600 kg BOD / 1000 m<sup>3</sup> /day,

15 Marks

With my best wishes

Prof. M. Elsheikh

This exam contribute by measuring in achieving Program Academic Standards NARS

Question No.	Q1-b, Q2-a, Q3-a, Q5-a, Q1-a, Q4-a, Q6-a	Q4-b, Q5-b	Q2-b, Q3-b, Q6-b
Skills	A-2, A-4, A-5, A-8, A-9, A-11, A-12 & A-13	B-8, B-10, and B-14	C-1, and C-10
	Knowledge & Understanding	Intellectual Skills	Professional Skills



